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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/779,742      | 02/18/2004  | Go Miya              | 648.42568VX1        | 2055             |

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EXAMINER

HASSANZADEH, PARVIZ

ART UNIT PAPER NUMBER

1763

DATE MAILED: 09/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/779,742

Applicant(s)

MIYA ET AL.

Examiner

Parviz Hassanzadeh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8 and 9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/18/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION*****Priority***

It is noticed that the Declaration (2/18/04) disclaim priority based on the JAPAN 2003-020904 (filed on 1/29/2003). It is also noted that applicant has not filed a certified copy of the Japanese application as required by 35 U.S.C. 119(b).

***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Le et al (US Patent No. 6,153,115).**

Le et al teach a plasma processing method using a plasma processing apparatus (Fig. 1) comprising a process chamber 12 for plasma processing a wafer 16; a light-receiving port 18 for monitoring a plasma emission in the process chamber; a radiation emission processor such as an optical emission spectrometer 30; an a plasma process analyzer 26 such as a computer for receiving and storing the digitized signals from the processor 22, analyzing the data and controlling the apparatus (column 5, line 30 through column 7, line 33),

the plasma processing method comprises monitoring of the process using *multivariate statistical analysis of plasma emission spectra* including: a step of converting the multi-channel signal output from the spectrometer unit 22 into a series (*batch*) of output signals; and performing a principal component analysis on the data which includes finding the differences between the output signal collected during the processing intervals (*preceding batch*); and comparing an indication of a historic-based discovered correlations with an indication of the

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current correlation condition to determine the plasma process condition as shown in Fig. 5-28) (column 2, line 14 through column 3, line 65).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Le et al (US Patent No. 6,153,115) in view of admitted prior art (Fig. 13, 14 and pages 1-11) and Kaji et al (US Patent No. 6,716,300 B2).**

Le et al teach a method of monitoring the status of a plasma processing using an optical emission spectrometry techniques as discussed above.

Le et al fail to teach a step of performing evacuation after a wet cleaning; a step of automatically determining whether a degree of vacuum is adequate or not.

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Admitted prior art (page 6) teaches a step of evacuating the process chamber after a wet cleaning step, wherein the chamber is evacuated to a predetermined degree of vacuum before a step of dry cleaning is carried out.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the wet cleaning step and the evacuation step as taught by the admitted prior art in the plasma processing method of Le et al in order to clean and maintain the chamber under a predetermined evacuation level suitable before the step of plasma processing the wafer.

Le et al also fail to teach a step of automatically determining whether there is an apparatus abnormality or not.

Kaji et al teach a method of monitoring a plasma processing apparatus using optical emission spectrometry, wherein an abnormality of the plasma processing is prevented in advance by issuing an abnormality signal, an alarm display or terminating a succeeding treatment in the case where the rate of the change should exceed a predetermined value (column 11, lines 55-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the step of determining the abnormality as taught by Kaji et al in the method of Le et al in order to terminate a succeeding treatment when an abnormality in the processing of the apparatus is detected.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Balasubramhanya et al (US Patent No. 6,521,080 B2) teach a method of monitoring a plasma processing employing principal component analysis on the plasma emission detected by an spectrometer.

Smith et al (US Patent No. 6,090,302), Jahns (US Patent No. 5,711,843) and O'Neill et al (US Patent No. 5,683,538) teach a method of monitoring a plasma processing using plasma emission detected by an spectrometer and controlling the apparatus based on the analyzed emission data.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (571)272-1435. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571)272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*P. Hassanzadeh*  
Parviz Hassanzadeh  
Primary Examiner  
Art Unit 1763

September 10, 2004